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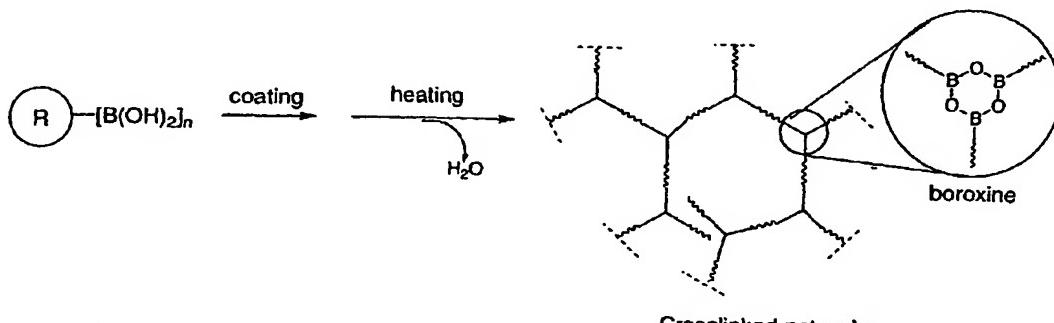
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[Continued on next page]

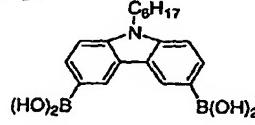
(54) Title: THERMALLY CROSSLINKABLE MATERIALS AND MULTI-LAYERED DEVICES THEREFROM



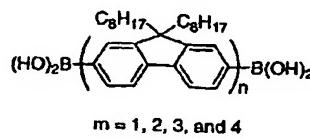
n = or >1;

R = organic or organometallic complex moiety including oligomer and polymer.

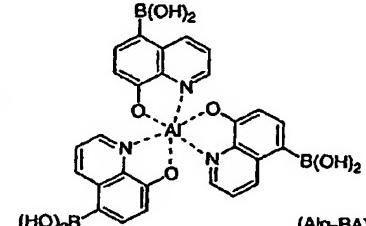
E.g.,



(CzBA)



(FnBA)



(Alq3BA)

(57) Abstract: The invention disclosed relates to cross-linkable composites of boronic acid or a boronic acid derivative such as a boronate, and an organic or organo-metallic moiety having a functionality such as hole transporting, electron transporting and light emitting, to cross-linked composites and to methods for making same. Multi-layer materials and optoelectronic devices including such cross-linked composites are also disclosed.

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European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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- *before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments*

INTERNATIONAL SEARCH REPORT

International Application No

PCT/03/01696

A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C09K11/06 H01L51/30 H05B33/14

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C09K H01L H05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, CHEM ABS Data, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00/22026 A (KREUDER WILLI ;AXIVA GMBH (DE); BECKER HEINRICH (DE); SPREITZER HU) 20 April 2000 (2000-04-20) page 6, line 1 - page 7, line 19 page 13 page 15 claim 7; example M2	1,2,10
X	US 2001/015614 A1 (TAGUCHI TOSHIKI) 23 August 2001 (2001-08-23) claims 3-5	1,2,10

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

*** Special categories of cited documents :**

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the International filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the International filing date but later than the priority date claimed

"T" later document published after the International filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search

30 March 2004

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INTERNATIONAL SEARCH REPORT

International Application No

PCT/03/01696

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>DATABASE CA [Online] CHEMICAL ABSTRACTS SERVICE, COLUMBUS, OHIO, US; CAREY, ROBERT I. ET AL: "Self-Assembled Monolayers Containing omega.-Mercaptoalkyl boronic Acids Adsorbed onto Gold Form a Highly Cross-Linked, Thermally Stable Borate Glass Surface" XP002275437 retrieved from STN Database accession no. 121:142536 abstract & LANGMUIR (1994), 10(7), 2228-34, -----</p>	1,2,10

INTERNATIONAL SEARCH REPORT

International application No.
PCT/CA 03/01696

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. Claims Nos.: because they relate to subject matter not required to be searched by this Authority, namely:

2. Claims Nos.: because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. Claims Nos.: because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

1, 2, 10

Remark on Protest

- The additional search fees were accompanied by the applicant's protest.
 No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: [1,2,10]

A crosslinkable composite of boronic acid or boronic acid derivative and an organic moiety having a functionality as light emitting.

2. claims: [1,2,10]

A crosslinkable composite of boronic acid or boronic acid derivative and an organometallic moiety having a functionality as light emitting.

3. claims: [1,2,10]

A crosslinkable composite of boronic acid or boronic acid derivative and an organic or organometallic moiety having a functionality as hole or electron transporting.

4. claims: 3-9

A crosslinked composite network formed by crosslinkable composite of boronic acid or boronic acid derivative and an organic or organometallic moiety having a functionality such as hole transporting, electron transporting and light emitting. Method of making it. Multilayer material comprising a plurality of layers of the crosslinked composite. Multilayer photoelectronic device comprising a layer of a transparent cross linked composite of boronic acid or boronic acid derivative and an organic or organometallic moiety having a functionality such as hole transporting, electron transporting and light emitting. A method of making the multilayer material.

5. claim: 11

A method of making a crosslinked functional network comprising reacting a compound having a boron atom and a second compound.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/03/01696

Patent document cited in search report	Publication date		Patent family member(s)		Publication date
WO 0022026	A	20-04-2000	DE 19846766 A1 AU 5743699 A CN 1330670 T DE 59908822 D1 WO 0022026 A1 EP 1123336 A1 JP 2002527553 T US 6653438 B1		20-04-2000 01-05-2000 09-01-2002 15-04-2004 20-04-2000 16-08-2001 27-08-2002 25-11-2003
US 2001015614	A1	23-08-2001	JP 2001172280 A JP 2001278887 A JP 2001284051 A US 2003050476 A1		26-06-2001 10-10-2001 12-10-2001 13-03-2003